



**Carnegie Mellon  
Software Engineering Institute**

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Pittsburgh, PA 15213-3890

# **Developing Enterprise-Wide Measures for Tracking Performance of Acquisition Organizations**

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Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE <b>JAN 2003</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2003 to 00-00-2003</b>	
4. TITLE AND SUBTITLE <b>Developing Enterprise-Wide Measures for Tracking Performance of Acquisition Organizations</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Carnegie Mellon University,Software Engineering Institute,Pittsburgh,PA,15213</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>28</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

## Purpose of Overall Effort

Develop a methodology to define enterprise-wide measures that reflect the “health” of a government organization that supports acquisition.

Apply methodology to ensure alignment between the enterprise-level goals of an organization and the measures used to characterize that organization's performance.

Use these measures as a guide to their overall performance and performance improvement effort.



# Overview Outline

Methodology

Major components

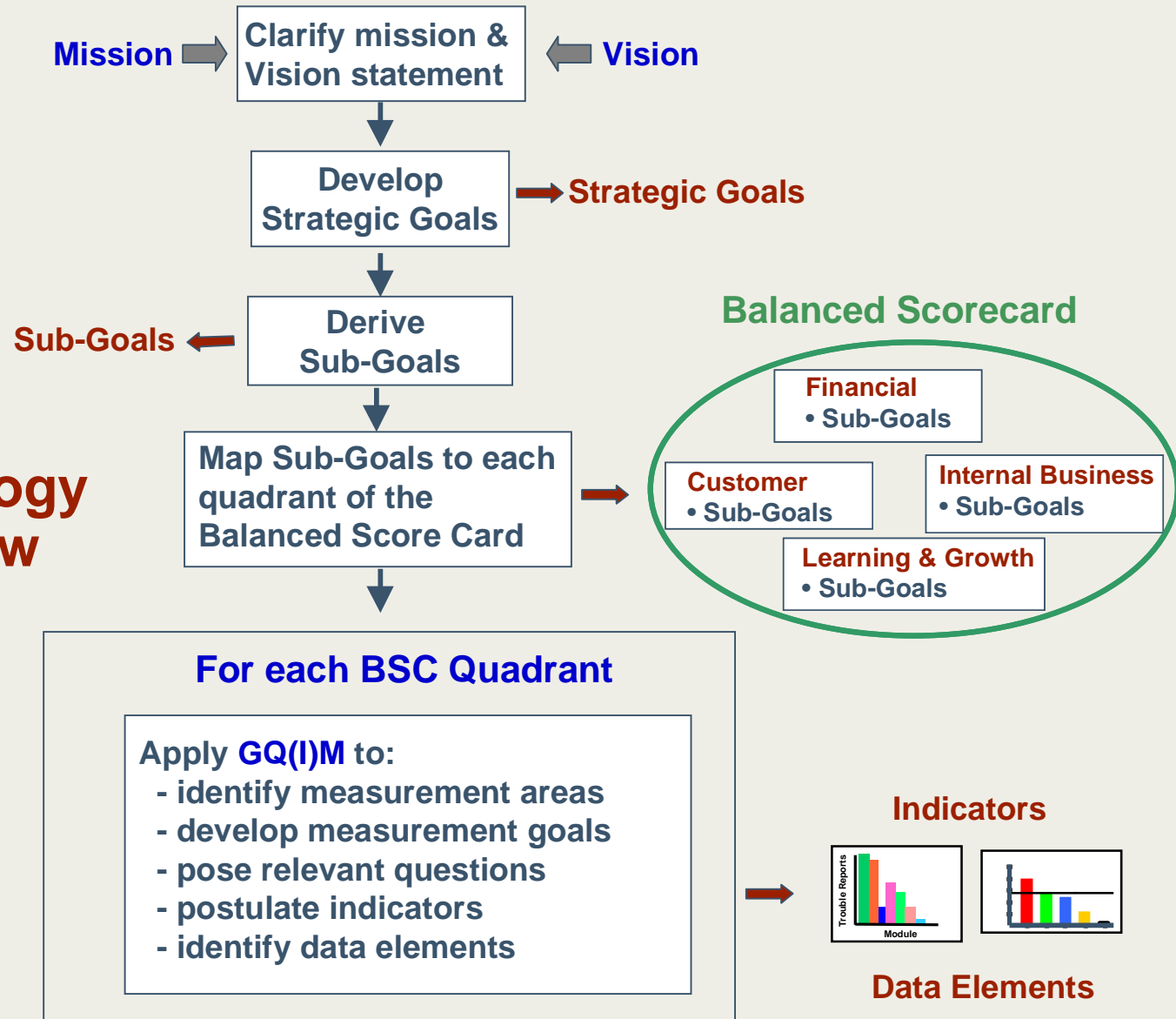
- BSC
- GQ(I)M

Example use

- Initial measurement areas
- Indicators

Summary

## Methodology Overview





# Major Components

## GQ(I)M

- Align measures with goals; ensure measures selected will be used

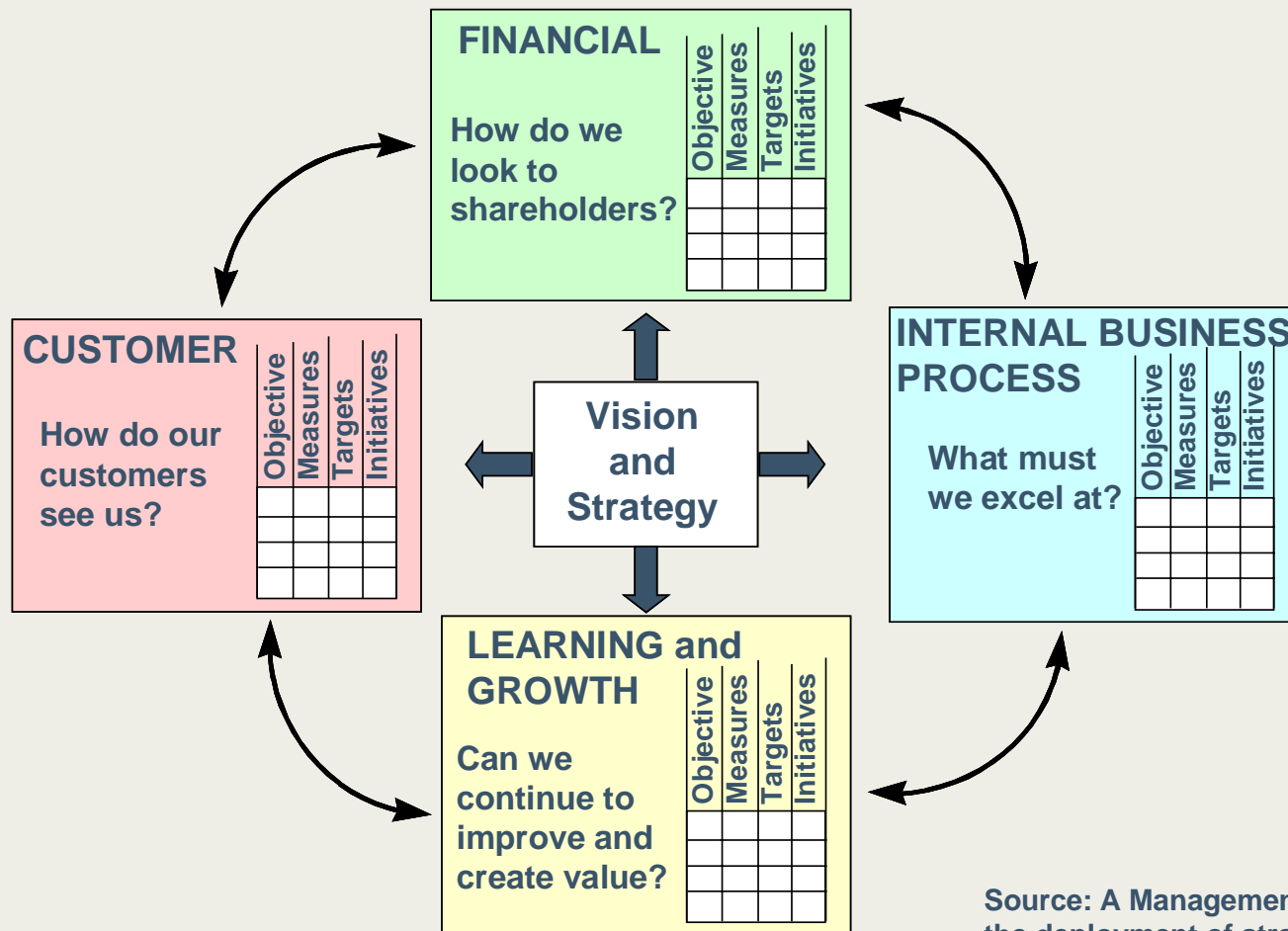
## Balanced Scorecard

- Ensure set of measures provides coverage of all elements of performance; avoid hidden trade-offs

## Process Model of Performance

- Select measures that are most meaningful with respect to selected areas of performance; prefer outcome then output measures over process and input measures

# A Balanced Scorecard Perspective on Performance



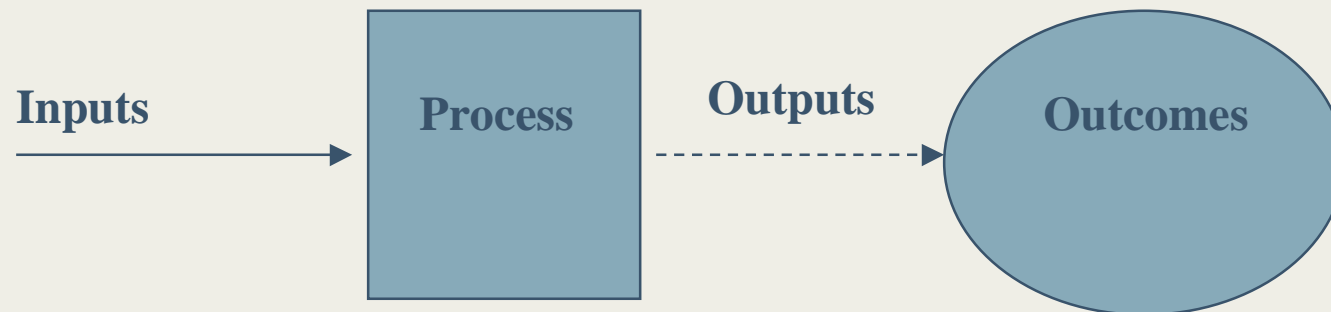
Source: A Management Guide for the deployment of strategic metrics, Ratheon

# Success Vs Progress Indicators





# Identifying Potential Measures: A Process Model of Performance



## Potential Measures

Resources  
consumed

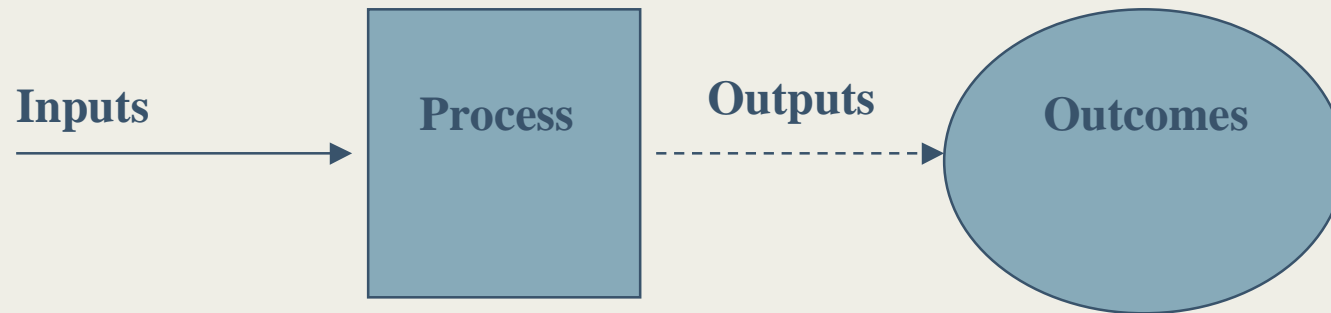
Throughput,  
tasks

Products  
and services

Impact on  
customer or user



# Identifying Potential Measures: A Process Model of Performance



**Goal: Increase Customer Satisfaction**

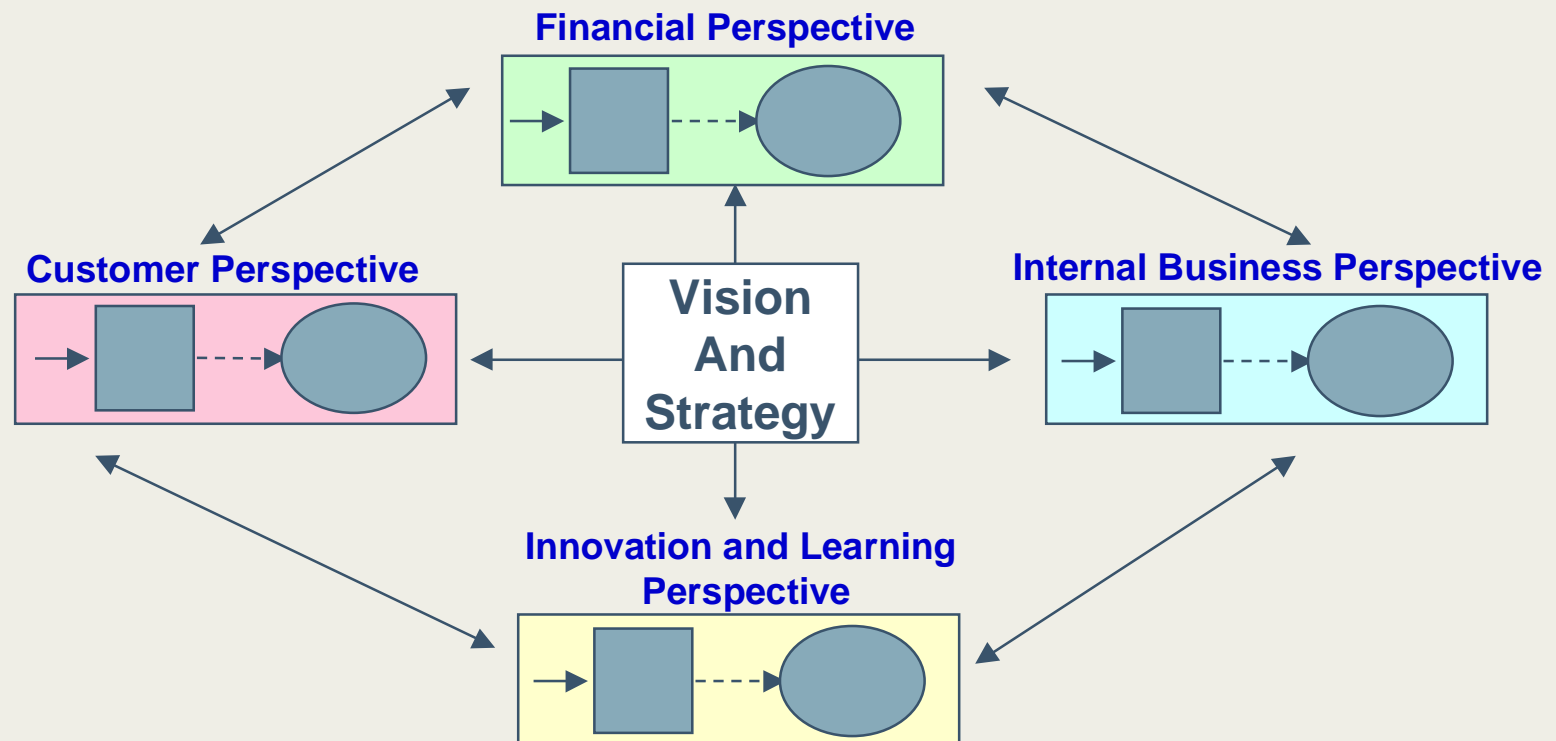
**Inputs** - dollars spent on customer service training, dollars spent on quality assurance

**Process** - number of work product inspections performed, number of tests performed

**Outputs** – number of new features released, resolution time for customer service calls

**Outcomes:** trends in customer satisfaction survey data, number of defects reported after release

# Balanced Scorecard Perspective: A Multi-dimensional view



Source: Kaplan and Norton, "Putting the Balanced Scorecard to Work" Harvard Business Review, Sept-Oct 1993

# Defining Indicators & Measures Based Upon Goals





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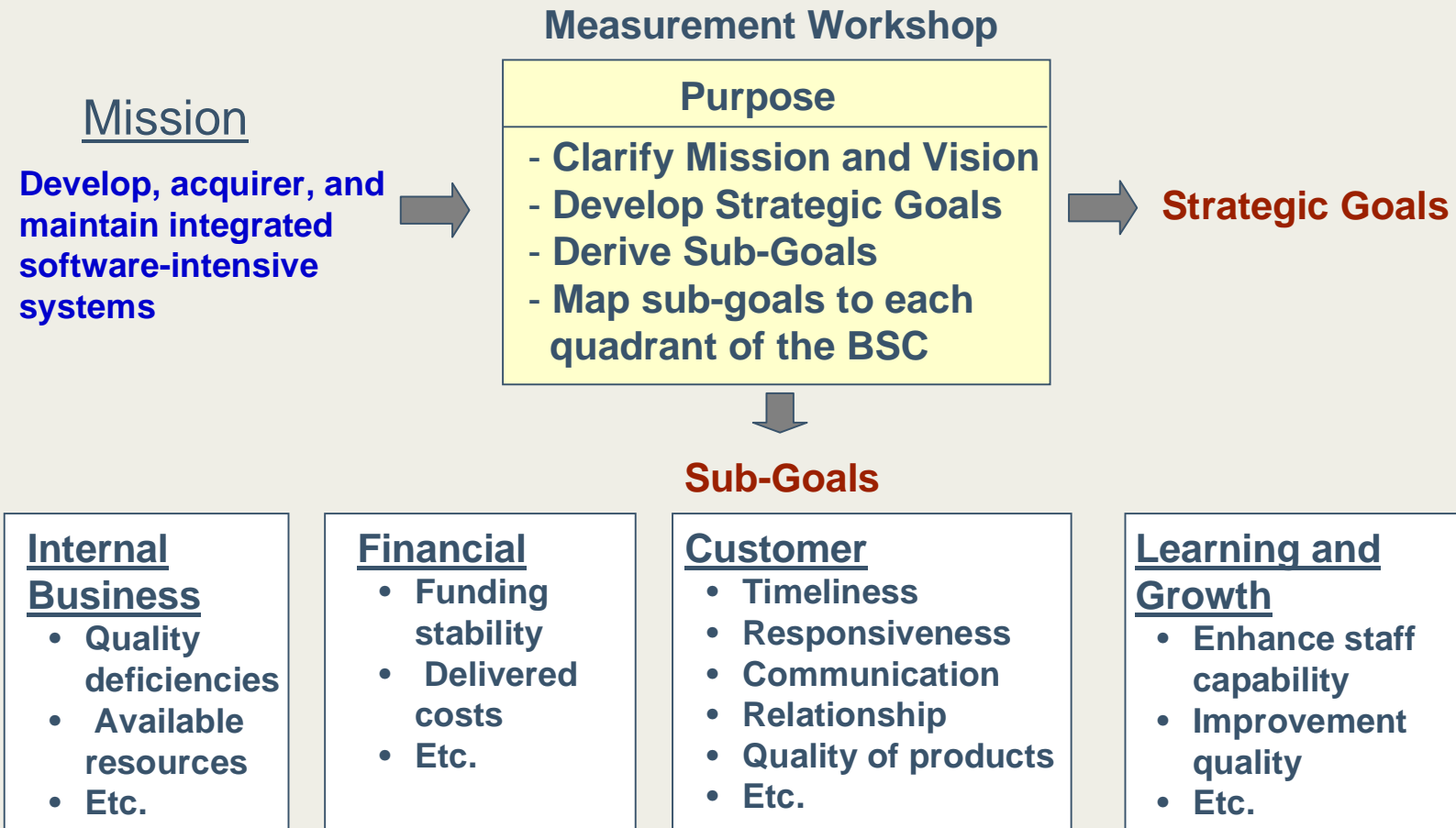


# Organization

Example based on aggregate of several organizations with similar characteristics

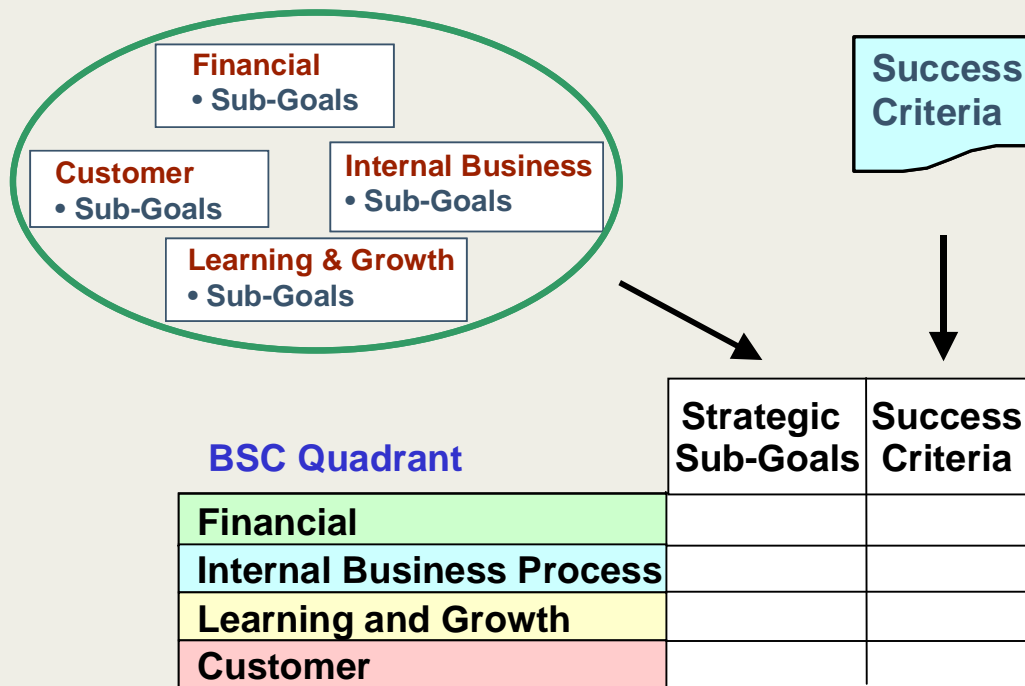
- Government agency consisting of 300 management, administrative, and technical personnel
- Development, maintenance and enhancement of system components of fielded systems, and acquisition

# Use of Methodology - Example



# Success Criteria

## Balanced Scorecard







## Typical Questions Related to Sub-Goals

### Customers' Viewpoint

- What is important to our customer? What are the customers' "hot buttons"?
- How do our customers evaluate timeliness?
- What does the customer consider a quality product? Are there any standards or goals currently set by the customer?
- How and what do our customers currently evaluate our organization?
- Etc.



# Initial Measurement Areas

## Customer

Customer satisfaction with delivered product  
Compliance with customer requirements  
On time delivery

## Financial

Funding stability  
Trend in Expenses

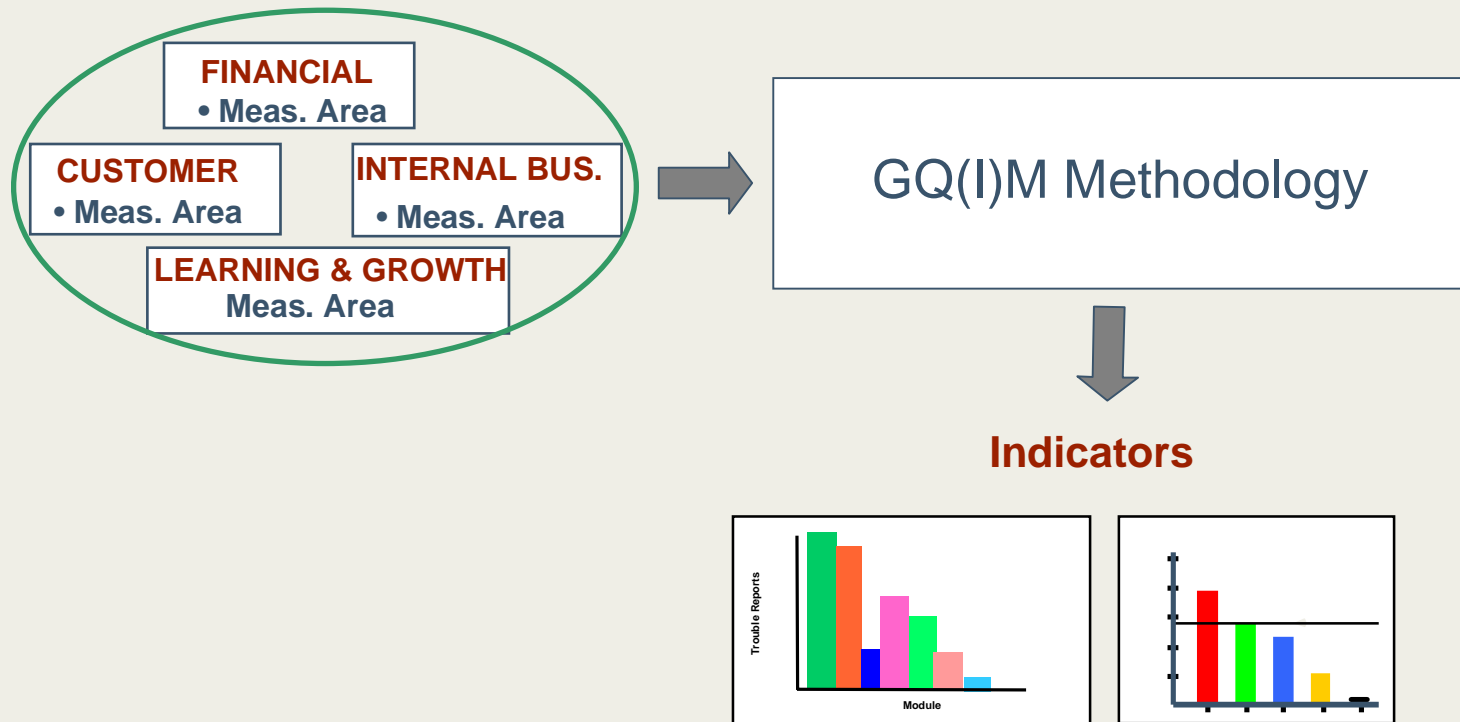
## Internal Business

Availability and capability of  
resources (staff)  
Status of open deficiencies in  
delivered projects  
Timeliness of projects completion

## Innovation & Learning

CMM level  
Trend in employee satisfaction  
Meeting functional requirements

# Measurement Areas to Indicators



# Internal Business

## Status of Open Deficiencies in Delivered Projects

Severity Levels	Number of Deficiencies That Have Been Open x Days				Totals
	$x < 30$	$30 < x \leq 60$	$60 < x \leq 90$	$x > 90$	
Severity 1	2	1			3
Severity 2	3	1	1		5
Severity 3	3	2	1	1	7
Severity 4	4	3	3	2	12
Severity 5	8	6	3	3	20
Totals	20	13	8	6	47



# Internal Business

## Availability and Capability of Resources (Staff)

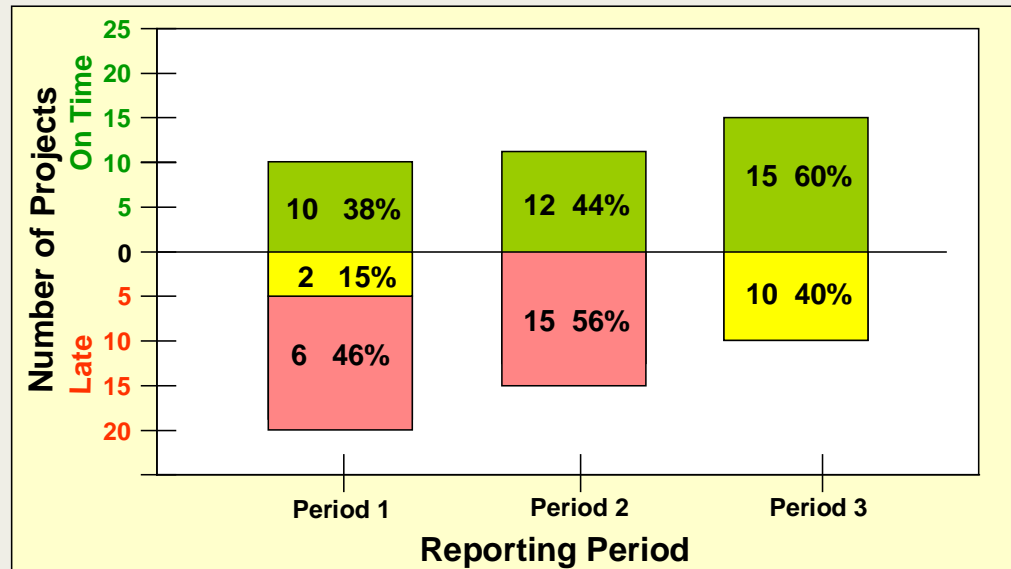
			FY 99		FY 00		FY 01	
			#	%	#	%	#	%
E&S	GOAL 40%	Entry Level						
		Journeyman						
		High Grade						
Tech	GOAL 45%	Entry Level						
		Journeyman						
		High Grade						
Other	GOAL 15%	Entry Level						
		Journeyman						
		High Grade						



# Internal Business

## Timeliness of Project Completion

Completed Projects in Reporting Period



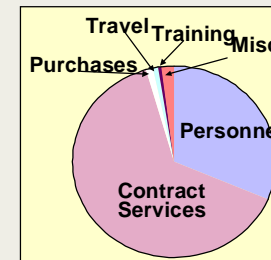
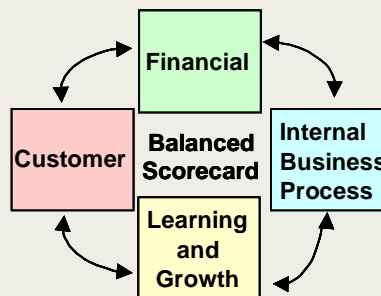
- on time or early
- exceeded original schedule by less than 10%
- exceeded original schedule by more than 10%

# Summary of Initial Results

- Satisfied with delivered Product
- Compliant with requirements
- On-time delivery

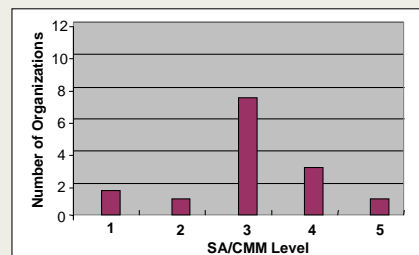
Compliance with customer requirements				
Total Systems	Full Compliance		Partial Compliance	
	#	%	#	%

- Funding stability
- Trend in Expenses



- Avail. & capability of staff
- Status of open deficiencies
- Timeliness of project completion

- Trend in employee satisfaction
- Meeting functional requirements
- CMM Level



Severity Levels	Number of Deficiencies That Have Been Open x Days				Totals
	x < 30	30 < x ≤ 60	60 < x ≤ 90	x > 90	
Severity 1	2	1			3
Severity 2	3	1	1		5
Severity 3	3	2	1	1	7
Severity 4	4	3	3	2	12
Severity 5	8	6	3	3	20
Totals	20	13	8	6	47



# Indicator Documentation

Documents the why,  
what, who, when,  
where, and how

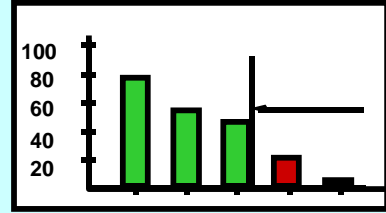
**INDICATOR TEMPLATE**

Measurement Goal # \_\_\_\_\_:

Objective \_\_\_\_\_

Questions \_\_\_\_\_

Visual Display



Category	Value
1	80
2	60
3	50
4	20
5	10

Input(s)

Data Elements \_\_\_\_\_

Responsibility \_\_\_\_\_

for Reporting \_\_\_\_\_

Form(s) \_\_\_\_\_

Algorithm \_\_\_\_\_

Assumptions \_\_\_\_\_

Interpretation \_\_\_\_\_

X-reference \_\_\_\_\_

Probing Questions \_\_\_\_\_

Evolution \_\_\_\_\_





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## Summary

The approach, using the BSC and GQ(I)M, provides a systematic way to obtain indicators and measures that reflect the health and performance of the organization.

The approach uses an organization's vision and mission statements to identify and clarify strategic goals and sub-goals.

The sub-goals are mapped to the balanced scorecard.

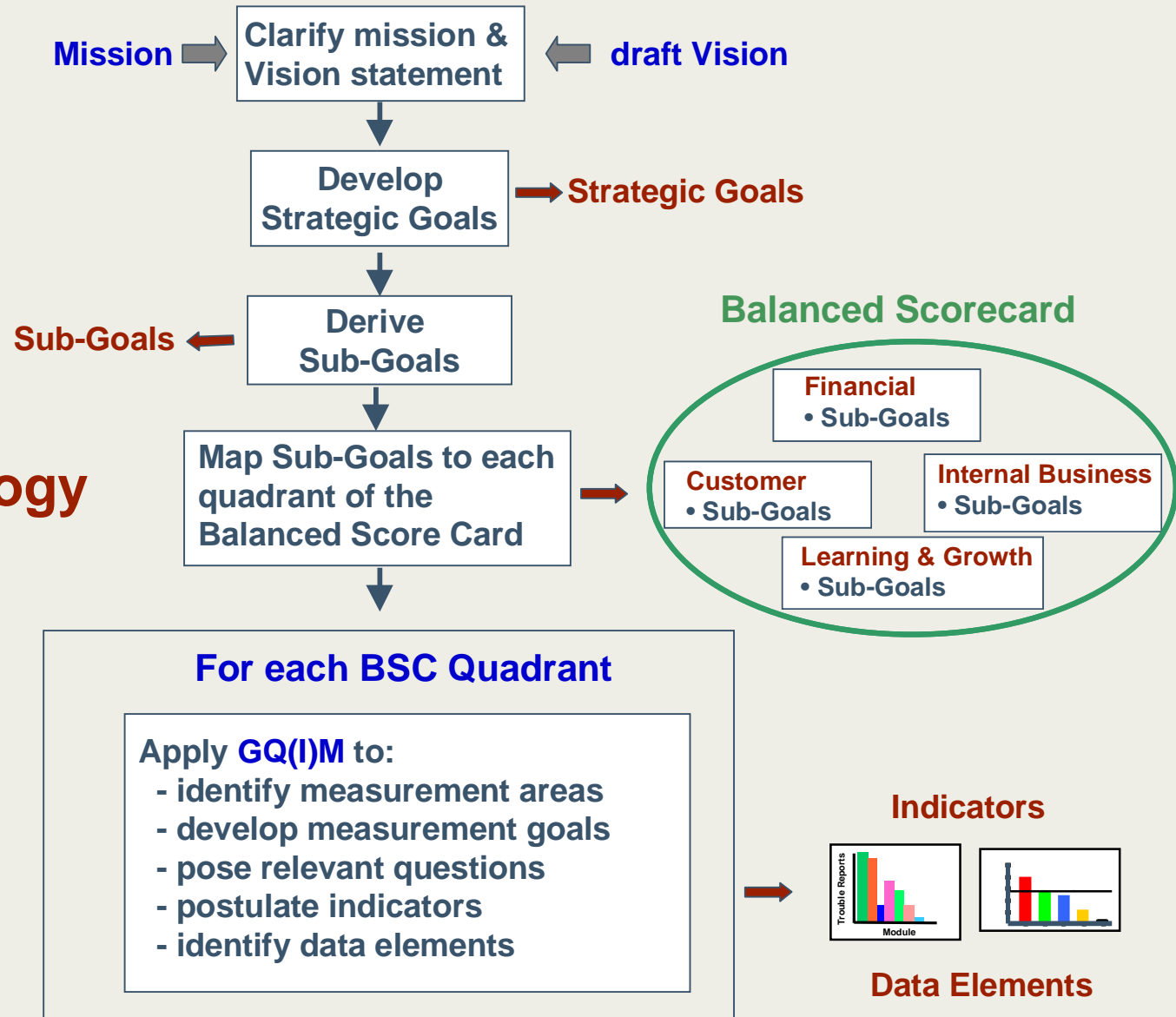
The GQ(I)M methodology is then used to identify measures and indicators

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### Bottom Line

We tried it; It worked; Now maturing methodology

# Methodology





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# Back-up Material



## Some Definitions

### Performance Management

“The use of performance measurement information to help set agreed-upon performance goals, allocate and prioritize resources, inform managers to either confirm or change current policy or program directions to meet those goals, and report on the success in meeting those goals.”

### Performance Measurement

“A process of assessing progress towards achieving predetermined goals, including information on [efficiency, quality, and] outcomes....

Source: “Serving the American Public: Best practices in performance measurement,” June 1997.